> In some design applications it is also desirable to have blocking plate laminations 32 which possess circumferential struts or baffles 11. These are shown in FIG. 1, and in FIG. 2. **The baffles 11 serve to form a circular seal which generally functions to keep the core cooling fluid out of the air-gap region between the rotor and stator core.** It is not necessarily desirable that this seal be tight. **In those circumstances in which core cooling and rotor cooling are accomplished using the same cooling fluid, the circumferential baffles 11 are typically not present.** This permits a substantial flow of core cooling fluid, typically hydrogen gas, directly into the air-gap. (It is standard practice in the art to refer to this region as the air-gap even though it is filled with a gas other than air.) Karhan, col. 3, lns. 50-56 (emphasis supplied).

Karhan et al teaches that cooling gas flowing through the air gap is desirable when both the stator and rotor are cooled being cooled by the same cooling gas. But, when the rotor is being cooled separately from the stator, Karhan teaches that the stator cooling gas is blocked from flowing into the air gap. The present invention contradicts the teaching of Karhan et al by routing the stator cooling gas through the air gap, even though the rotor is not cooled by the stator cooling gas.

The rejection of claims 4, 9, 13, 18 and 23 as being obvious over Karhan et al in view of Kleinhans (U.S. Patent 4,845,394) is traversed for the same reasons as stated above with respect to why Karhan et al teach away from the claimed invention. Further, Kleinhans teaches a conventional rotor-stator cooling system in which cooling gas flows from the rotor, through the air gap and into the stator. Kleinhans does not suggest that the rotor and stator cooling systems be separate, and does not contravene the teaching in Karhan et al that air gap cooling is not desired if the rotor is separately cooled from the stator. The heat exchanger disclosed in Kleinhans does not alter the fact that Kleinhans

discloses a combined rotor and stator cooling system or that Karhan et al teaches away from the claimed invention. Accordingly, the combination of Karhan et al and Kleinhans does not disclose or suggest the claimed invention.

The rejection of claims 8, 10 and 17 as being obvious over Karhan et al in view of Jarczynski et al (U.S. Patent 5,633,543) is traversed for the same reasons as stated above with respect to Karhan et al. While Jarczynski et al discloses a reverse flow combined rotor and stator cooling system, they do not suggest separate cooling systems for a stator and rotor. Further, Jarczynski et al do not suggest that the teachings of Karhan et al be contravened to force cooling gas through the air gap, when the rotor is not being cooled by the same gas.

All claims are in good condition for allowance. If any small matter remains outstanding, the Examiner is requested to telephone the undersigned. Prompt reconsideration and allowance of this application is requested.

Attached hereto is a marked-up version of the changes made to the specification and claim(s) by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made**."

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: ______________________
Jeffry H. Nelson
Reg. No. 30,481

JHN:glf
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) A synchronous machine comprising:

a rotor coupled to a rotor cooling system, wherein said rotor is cooled by a rotor cooling fluid passing through said rotor;

a stator around the rotor and separated from the rotor by an annular gap between the rotor and an inner surface of the stator, and

a stator ventilation system [separate and independent of the rotor cooling system] wherein the stator ventilation system injects a cooling gas into the stator, and said cooling gas flows through the stator and exits the stator at the annular gap and wherein said rotor being impervious to said cooling gas.

3. (Amended) A synchronous machine as in [claims 2] claim 1 wherein the cooling gas flows through stator gas passages.

4. (Amended) A synchronous machine as in claim 1 wherein said ventilation system further comprises a heat exchanger mounted on said machine radially outward of said stator.

5. (Amended) A synchronous machine as in claim 1 wherein said rotor comprises a superconducting coil, and said rotor cooling system provides the rotor cooling fluid as a cryogenic cooling fluid to said coil.

9. (Amended) A synchronous machine as in claim 1 wherein said ventilation system is a closed-loop system in which <u>a</u> cooling gas circulates through the stator and a heat exchanger in a flow path of the gas.

10. (Amended) A synchronous machine as in claim 1 wherein said ventilation system is an open-loop system in which <u>a</u> cooling gas passes through the stator and the air gap, and exhausts to an environment outside of the machine.

11. (Amended) A superconducting electromagnetic machine comprising:

a solid core rotor having a cryogenically cooled superconducting rotor coil winding;

a stator coaxial with said rotor and having stator coils magnetically coupled with said superconducting rotor coil winding, said stator coils arranged around said rotor, and said stator having cooling passages extending from an outer periphery of the stator to an inner periphery of the stator, said inner periphery separated from the rotor by an annular air gap;

said rotor having cooling passages for <u>a</u> cryogenic cooling fluid;

<u>an annular air gap between said solid core rotor and said stator, wherein said annular gap having at least one lateral opening comprising a cooling gas passage port and said annular gap being substantially open along a length of said rotor;</u>

a stator ventilation system providing <u>a</u> cooling gas to said outer periphery of the stator and said passages of the stator<u>, wherein said cooling gas flows through said annular gap and through said cooling gas passage port</u>.

12. (Amended) A superconducting electromagnetic machine as in claim 11 wherein the cooling gas exits the stator at [outlets in the passages] <u>said cooling gas passage port</u> open to the annular air gap.

13. (Amended) A superconducting electromagnetic machine as in claim[s] 11 wherein said ventilation system further comprises a heat exchanger.

18. (Amended) A superconducting electromagnetic machine as in claim 11 wherein said ventilation system is a closed-loop system in which <u>a</u> cooling gas circulates through the stator and a heat exchanger in a flow path of the gas.

20. (Amended) A method for cooling a superconducting electromagnetic machine having a solid core rotor including a superconducting rotor coil winding and a stator and a stator ventilation system, said method comprising the steps of:

a. cryogenically cooling the rotor coil winding [independently of cooling the stator];

b. cooling the stator with a cooling gas flowing through the stator, and

c. drawing the cooling gas out of the stator into a air gap between the stator and <u>the</u> rotor core, where<u>in</u> the cooling gas [is isolated from any rotor cooling system] <u>flows through the air gap without flowing through the rotor core</u>.

21. (Amended) A method for cooling as in claim 20 wherein the cooling gas flows into an outer periphery of the stator, through [the] stator cooling gas passages and out into the air gap.

23. (Amended) A method for cooling as in claim 20 wherein said cooling gas is drawn by a fan out of the air gap and is directed to a heat exchanger, and said method

further comprises extracting heat from the cooling gas by the heat exchanger, and circulating the cooling gas through the stator and <u>the</u> heat exchanger.